

Volutes from Saya de Malha Bank: The Saga of *Lyria surinamensis* and a New Species

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ABSTRACT

The supposedly fulgorariine volute *Dallivoluta surinamensis* Okutani, 1982 is shown to have been described from an erroneous type locality in the Caribbean. It actually originates from Saya de Malha Bank, in the Indian Ocean, where it is probably endemic. *Dallivoluta* Okutani, 1982 is regarded as a synonym of *Lyria* Gray, 1847. It is further suggested that *Murex surinamensis* Okutani, 1982 was also erroneously localized and actually originates from the same submarine Indian Ocean bank. *Lyria doutei* n.sp. is described from Saya de Malha, and compared with other species in the group of *L. lyraeformis*. Endemism on Saya de Malha is discussed in connection with the history and isolation of the bank.

Key words: Indian Ocean; Mascarene Plateau; Caribbean; Volutidae; endemism.

INTRODUCTION

In the last few months, collectors in Western Europe have obtained from Russian sources specimens of two remarkable volute species trawled by Soviet research vessels on Saya de Malha Bank, in the Indian Ocean. Nothing similar had been described from the Indo-Pacific, and the Saya de Malha shells appeared to represent two new species of *Lyria*, when we noticed the identity of one of them with *Dallivoluta surinamensis* Okutani, 1982. We present below the reasons why we believe that *D. surinamensis* was erroneously localized in the original description, we synonymize *Dallivoluta* with *Lyria*, and we describe the second *Lyria* as a new species.

The species *Dallivoluta surinamensis* Okutani, 1982: The volute *Dallivoluta surinamensis* was described as a new genus and species, based on a single dead shell (figure 1) and fragments collected by Japan Marine Fishery Resources Research Center (JAMARC), supposedly off the coast of Surinam in December 1978 (Okutani, 1982:115). The type locality was given as 11°03'N, 61°01'W, depth 128 m. Okutani (in Takeda & Okutani, 1983:290) provided an abridged description and color photographs of the holotype. No further original information on *Dallivoluta surinamensis* has been published since the original description.

Okutani (1982) compared *Dallivoluta* with *Tractolira* Dall, 1869 and especially *Fulgoraria* Schumacher, 1817, which is probably the reason why Poppe (1987:14) placed *Dallivoluta* in the subfamily Fulgorariinae.

The type locality: The type locality indicated by Okutani (1982) is not situated off Surinam, as the specific name would imply. The geographical coordinates indicate a position 700 km to the northwest of Surinam, between the islands of Trinidad and Tobago, off Venezuela. The depth (128 m) is in the range of depths found around these islands. The type locality of *Murex surinamensis* Okutani, 1982, described in the same paper, is 10°46'N, 61°32'W, 94 m. These coordinates indicate a position on the island of Trinidad, not in the seas around it.

In fact, neither of these localities falls within the area encompassed by the JAMARC study area off Surinam and French Guiana (Takeda & Okutani, 1983:9, 11), and there are grounds to suspect that they are erroneous. Vokes (1990a:4, footnote; 1990b:6) had expressed doubts on the type locality of *Murex surinamensis*, and suggested that "opportunity for mixed locality data is certainly present" (Vokes, 1990a).

Identity of *Dallivoluta surinamensis* with the Saya de Malha volute: The volutes obtained from Soviet sources belong to two different species of *Lyria*. Of one of these, we have seen two complete shells, empty but very fresh and probably live taken, said to have been collected by Soviet research vessels on Saya de Malha: one is in the Douté collection (Germany); the other is in the second author's collection (figure 2). In addition, we have seen photographs of a third specimen from another private collection. Comparison of this material with Okutani's (1982, 1983) description and figures (this paper figure 1) leaves no doubt as to their identity. The spiral cords are more distinct on the spire whorls of the newly collected specimen, but this is undoubtedly due to the better preservation of this shell.

We therefore conclude that the type locality is erroneous. When the geographical coordinates of the type locality are read with South instead of North, and East instead of West (i.e., 11°03'S, 61°01'E, instead of 11°03'N,

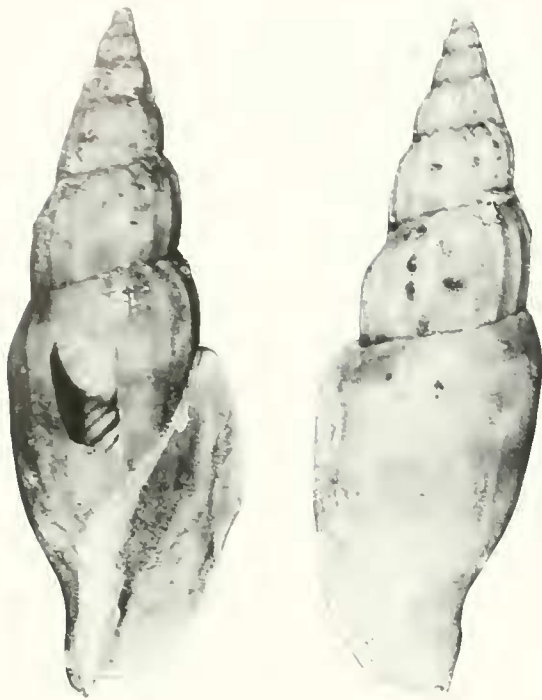


Figure 1. *Lyria surinamensis* (Okutani, 1982). Holotype (from Okutani, in Takeda & Okutani, 1983). Height 105 mm.

61°01'W), the position given is precisely correct for Saya de Malha Bank, in the Indian Ocean! We also suggest that the type locality of *Murex surinamensis* is similarly inaccurate, and should be read 10°46'S, 61°32'E, also on Saya de Malha Bank. This would confirm the observation by Ponder and Vokes (1988:12) and Vokes (1990a:4, 1990b:6) that there are no species of *Murex* s.s. in the New World.

It would thus appear that the Surinam material provided to Dr. Okutani by JAMARC had unfortunately been contaminated by specimens trawled from the Indian Ocean.

Dallivoluta surinamensis and *Murex surinamensis* will add to the list of species with unfortunate geographical specific names, such as the Caribbean *Cassis madagascariensis* Lamarck, 1822, originally believed to come from Madagascar, or *Puncturella agulhasae* Clarke, 1961, the type locality of which was erroneously believed to be within the limits of Agulhas Basin (see Barnard, 1963: 296). A similar case of mistaken geographical coordinates concerns the magellanic *Marginella warrenii* Marrat, 1876, described from 50°23'N, 64°04'W (Gulf of St. Lawrence), an error for 50°23'S, 64°04'W (between the Falklands and Cape Horn) (Bavay, 1913).

***Dallivoluta*, a synonym of *Lyria*:** Okutani was struck by the general resemblance of *D. surinamensis* with the NW Pacific genus *Fulgoraria* and regarded the non-tilted protoconch, whitish columellar callus and color pattern to differ from the character states observed in

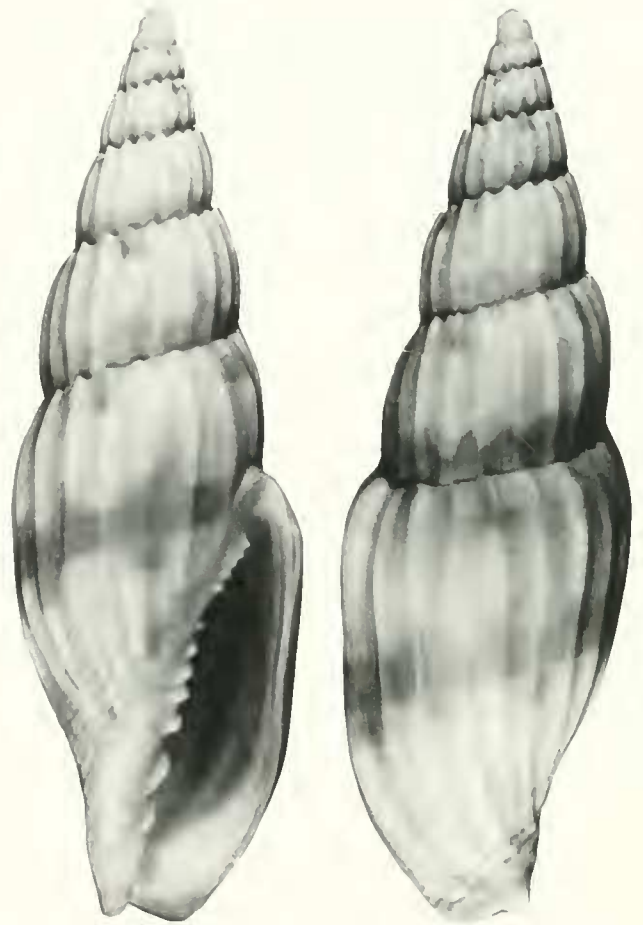


Figure 2. *Lyria surinamensis*. Specimen collected on Saya de Malha Bank by Soviet vessels (Bail collection). Height 87 mm.

Fulgoraria. However, we find *D. surinamensis* most closely related to the E. African *Lyria lyraeformis* (Swainson, 1821) and regard the generic characters enumerated by Okutani to be of specific importance only. The shell characters of *Dallivoluta surinamensis* fall within the range observed in the genus *Lyria*, as restricted by Bouchet (1990), and we regard *Dallivoluta* Okutani, 1982 as a synonym of *Lyria* Gray, 1847.

Description of *Lyria doutei*: The second species of *Lyria* obtained from Soviet sources is known to us from a single shell, originally in the Douté collection. At least one other specimen was collected. It is in a private collection in Europe or North America, and was available for examination.

Lyria doutei n.sp.
(figures 4, 5)

Type material: Holotype in (Muséum national d'Histoire naturelle (MNHN), leg. H. Doute).

Type locality: Saya de Malha Bank, 10°30'S, 62°25'E, 135 m.

Description: Shell (figure 4) large, fusiform, solid, consisting of 1.5 protoconch and 6 teleoconch whorls. Protoconch (figure 5) bulbous, with an indication of a calcarella on the initial part, remaining part with convex smooth whorls. Protoconch/teleoconch transition sharp. Teleoconch whorls convex, with appressed, but very slightly channeled suture. Sculpture consisting of orthocone, gently sigmoid axial ribs; no spiral sculpture. Fourteen axial ribs on first teleoconch whorl, gradually increasing to 24 on body whorl. Last rib forming a thick labial varix behind outer lip. Aperture ovate, outer lip smooth, inner lip with thin glaze over body whorl and two groups of plaits; 8 plaits in columellar region, decreasing in strength from base to apex of shell; after a smooth zone, 3 weaker plaits in parietal region. Siphonal canal short, broad, open. Ground color creamy beige with a more complex pattern of yellowish brown to brown flamules and lines arranged in spiral bands. Spire whorls with two darker bands, adapically and abapically, separated by lighter band on mid part of whorl. Adapical band with 6 brown flamules usually extending over one rib and part of the interspaces adjacent to it; brown flamules on abapical band with more indistinct contour. Medial light band with two interrupted brown spiral lines. Body whorl with one light band, and one dark basal band in addition to pattern described above. Aperture creamy beige.

Dimensions: Height 83.5 mm, breadth 30.0 mm, aperture 39 mm.

Remarks: *Lyria doutei* is named after Mr. Harald Doute (Bad Säckingen, Germany), a keen collector specializing in volutes who first recognized it as a new species. Mr. Doute generously provided the holotype, which he had acquired from Mr. Igor Bondarev (Sebastopol, USSR).

Four Indian Ocean species have a general shell morphology and/or color pattern that resemble that of *L. doutei*. These are: *L. lyraeformis*, *L. leslieboschae* Emerson & Sage, 1986, *L. cloveriana* Weaver, 1963 and *L. surinamensis*.

Lyria lyraeformis differs by having fewer axial ribs on the body whorl: it has 16 ribs in southern populations (Mombasa region, southern Kenya), and 20–23 ribs in northern populations (northern Kenya and Somalia). The color pattern of *L. lyraeformis* is extremely stable over its entire range: there are three uninterrupted brown bands on the body whorl, each lined with a dark brown (sometimes interrupted) thread; these brown bands are separated by two lighter spiral bands, each of them carrying 4–7 brown lines. *Lyria lyraeformis* also has a somewhat larger protoconch (height 4.9–5.4 mm vs 4.0 mm in *doutei*), and when more specimens of *L. doutei* are known it may appear that *L. lyraeformis* reaches a significantly larger adult size: Weaver & DuPont (1970) record specimens of 145 mm, but we have seen adults of 180 mm.

Lyria leslieboschae is known only from the four shells on which the original description was based (Emerson & Sage, 1986). It is recognized by the distinct anal canal

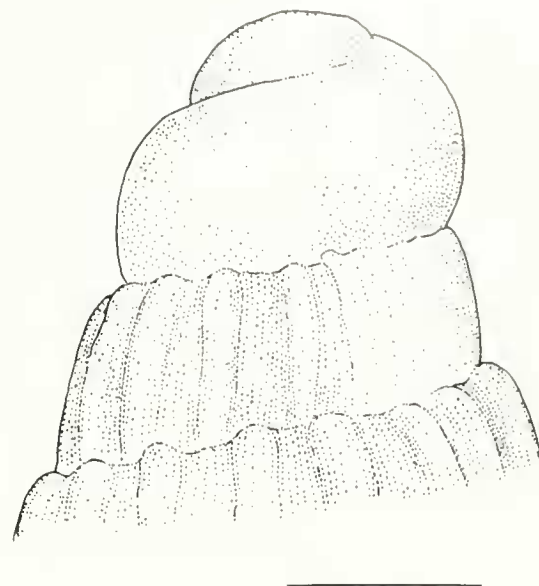


Figure 3. *Lyria surinamensis*. Protoconch of specimen in figure 2. Scale line 2 mm.

formed by its outer lip. Its color is of the *lyraeformis* type, but with a more diffused pattern. This species differs from both *L. lyraeformis* and *L. doutei* by having dark axial flamules interrupting the lighter spiral bands.

Lyria cloveriana is more distantly related. It has an even larger protoconch (height 6.4–7.1 mm); the axial ribs become obsolete on the abapical part of the body whorl; and the color pattern consists of evenly spaced reddish brown spiral lines, without distinct darker spiral bands as in the other species discussed above.

Finally, *L. surinamensis* differs from *L. doutei* by having spiral cords in addition to the axial ribs. *Lyria surinamensis* may also have fewer (19) ribs on body whorl, and the color pattern consists only of poorly defined orange-brown spiral bands on lighter beige background.

Mode of development and biogeographical remarks:

The bulbous protoconch of *Lyria surinamensis* (figure 3) and *L. doutei* (figure 5) are comparable in size with those of *L. lyraeformis* and *L. cloveriana* Weaver, 1963. As in all other modern volutes, it indicates non-plancetotrophic development, and the large size further suggests intracapsular metamorphosis and hatching as a crawling juvenile (Bouchet & Poppe, 1988). This type of development is incompatible with long distance passive transport of larvae and/or juveniles and, considering the isolation of Saya de Malha Bank (figure 6), suggests that *L. surinamensis* and *L. doutei* are endemic to this bank.

Saya de Malha Bank is a large (ca. 4,000 km²) flat plateau arising abruptly from the Indian Ocean sea-floor, from depths in excess of 4,000 m. Its shallowest parts reach as shallow as 10 m, with the large summital area within the 200 m isobath. Together with the Seychelles

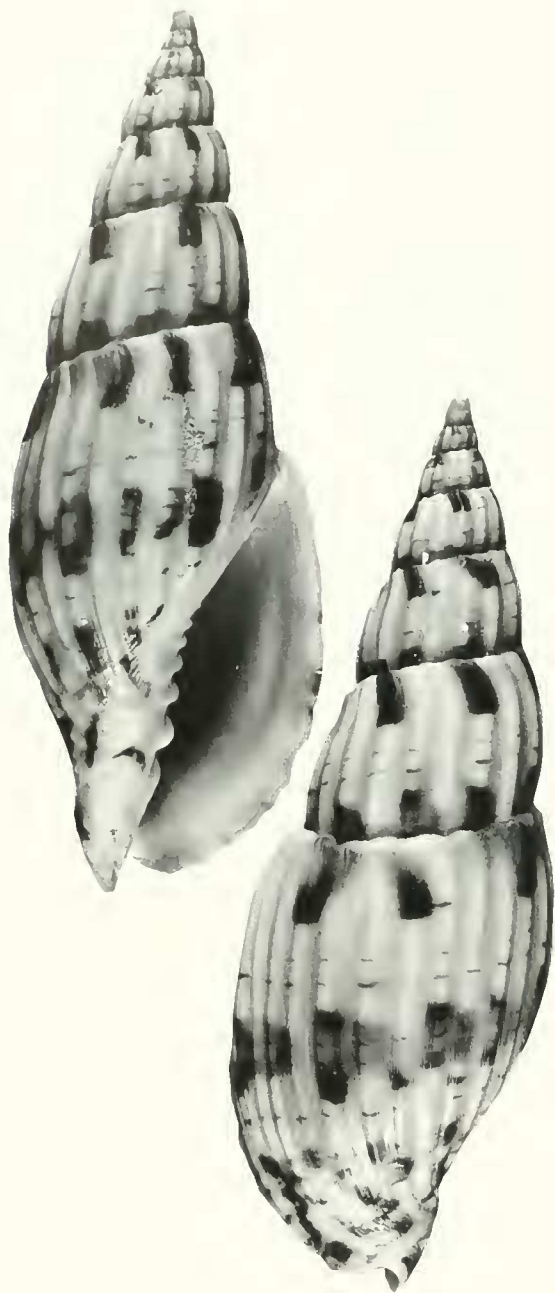


Figure 4. *Lyria doutei* n.sp. Holotype MNHN. Height 83.5 mm.

Bank to the northwest and Nazareth and Cargados Carajos Banks to the south, it forms the Mascarene Plateau. The Seychelles Bank is composed of late Precambrian granitic rocks and is sometimes called the Seychelles Microcontinent. On the other hand, Saya de Malha, Nazareth and Cargados Carajos Banks have been formed by the Réunion hotspot, Saya de Malha being the oldest in the arc. It dates back to the Paleocene, while the carbonate rocks on Nazareth Bank are not older than Eocene (Backman *et al.*, 1988). Saya de Malha and Nazareth are separated by a sill shallower than 500 m and are only 200–250 km apart. Saya de Malha is separated from the

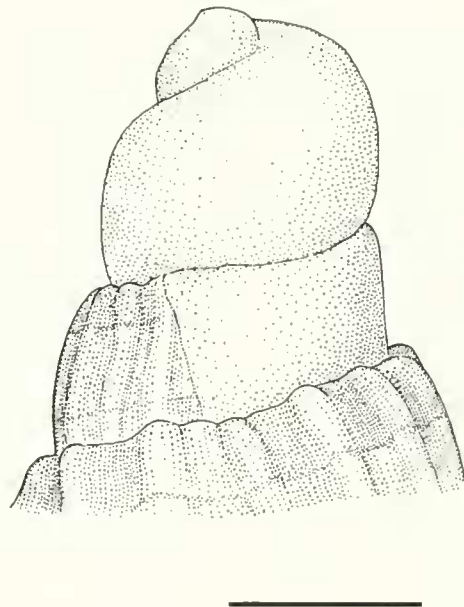


Figure 5. *Lyria doutei* n. sp. Protoconch of holotype. Scale line 2 mm.

Seychelles Bank by depths greater than 2,000 m and a distance of about 650 km. Distances to other *Lyria*-inhabited continental shelves are: Saya de Malha–Madagascar, 1,200 km; Saya de Malha–Kenya, 2,000 km; Saya de Malha–Sri Lanka, 2,700 km.

For shelf-living volutes with large, crawl-away juveniles, this means that Saya de Malha and Nazareth Banks are very isolated structures that are not easily colonized. However, because they have never been connected to a land mass since *Lyria* appeared in the Eocene, only the dispersal of demersal lecithotrophic larvae can account for colonization of such isolated oceanic banks. It is therefore remarkable that *Lyria surinamensis* has one of the largest protoconchs in the genus, and that its conchological affinities appear to be with species geographically remote: *L. lyraeformis* (Kenya), *L. leslieboscuae* Emerson & Sage, 1986 (Arabian Peninsula), *L. cloveriana* Weaver, 1963 (Sri Lanka). We hypothesize that the following scenario may have taken place: 1. Saya de Malha is colonized by an ancestral *Lyria* species with smaller, lecithotrophic, demersal larvae, having a broad Indian Ocean distribution; 2. The species evolves intracapsular metamorphosis with large crawl-away juveniles (this is a general trend in volute evolution and has been noted, *e.g.*, by Hansen (1983) in American Paleogene volutes), demersal dispersal is lost; 3. Geographical isolation enhances genetic isolation, and morphological divergence accumulates through time into different species.

Lyria anna (Lesson, 1835) is another volute endemic to this part of the Indian Ocean. The origin of this species has long remained mysterious (Weaver & Dupont 1970), but there are indications that it probably originates from Mauritius (Richards, 1990), nearby areas NE of Mauritius in 170–230 m (Anonymous, 1984) and/or Cinq Brandons

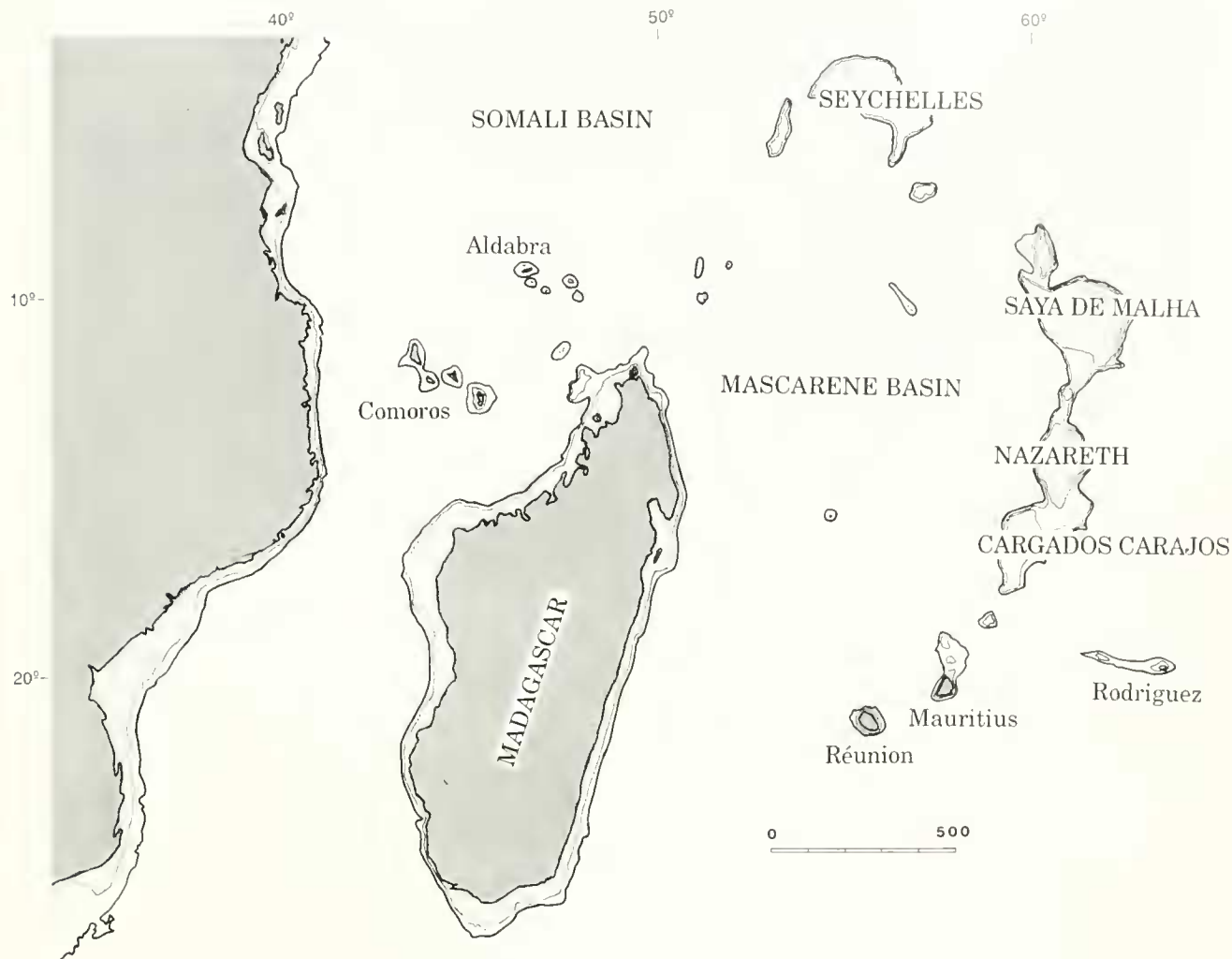


Figure 6. Simplified bathymetric map of the southwestern Indian Ocean banks, showing the localities mentioned in the text. Stippled area, 0–100 m; thin intermediate line, 200 m isobath; thick line, 500 m isobath. Scale line 500 kilometers.

shoals on the Cargados Carajos Bank of the Mascarene Plateau (unverified information from local Mauritius collectors and dealers). *Lyria anna* is conchologically not closely related to *L. surinamensis* and indicates that the colonization scenario above has occurred several times in the family Volutidae. We predict that more species of Volutidae will be found on banks of the Mascarene Plateau, including the Seychelles Bank.

Finally, it is noteworthy that, beside *Lyria surinamensis* and *Murex surinamensis*, *Conus primus* Röckel & Korn, 1990 was very recently described from Saya de Malha Bank, at depths of 80–98 m. It also has a paucispiral protoconch indicating non-planktotrophic larval development.

LITERATURE CITED

- Anonymous. 1984. *Lyria* (*Harpecola*) *anna* live dredged. La Conchiglia 184/185:22.
- Backman, J. *et al.* 1988. Introduction. Proceedings of the Ocean Drilling Program, Initial Reports 115:5–15.
- Barnard, K. H. 1963. Contributions to the knowledge of South African marine Mollusca. Part IV. Ann. S. Afr. Mus. 47(2): 201–360.
- Bavay, A. 1913. (no title). Journal of Conchology 14(4):98–99.
- Bouchet, P. 1990. Systematics of *Pliocoliva* with description of a new subfamily (Gastropoda: Volutoidea). Archiv für Molluskenkunde 120(1/3):1–10.
- Bouchet, P. and G. Poppe. 1988. Deep water volutes from the New Caledonian region, with a discussion on biogeography. Venus 47(1):15–32.
- Hansen, T. 1983. Modes of larval development and rates of speciation in early Tertiary Neogastropods. Science 204: 501–502.
- Okutani, T. 1982. A new genus and five new species of gastropods trawled from off Surinam. Venus 41(2):109–120.
- Ponder, W. F. and E. H. Vokes. 1988. A revision of the Indo-West Pacific fossil and Recent species of *Murex* s.s. and

- Haustellum* (Mollusca: Gastropoda: Muricidae). Records of the Australian Museum, suppl. 8:1-160.
- Poppe, G. 1987. New Volutes since 1970, part 1. *La Conchiglia* 218-219:8-22.
- Richards, A. 1990. Mauritius, Ile de France. *American Conchologist* 18(4):8-10.
- Röckel, D. and W. Korn. 1990. *Conus* species from the Western Indian Ocean, dredged by Soviet biologists. *Acta Conchyliorum* 2:45-49.
- Takeda, M. and T. Okutani. 1983. Crustaceans and mollusks trawled off Suriname and French Guiana. JAMARC, Tokyo. 356 p.
- Vokes, E. H. 1990a. What ever happened to dear old Murex? *American Conchologist* 18(1):3-7.
- Vokes, E. H. 1990b. Cenozoic Muricidae of the Western Atlantic region. Part VIII. *Murex* s.s., *Haustellum*, *Chicoreus*, and *Hexaplex*. Additions and corrections. *Tulane Studies in Geology and Paleontology* 23(1-3):1-96.
- Weaver, C. S. and J. E. DuPont. 1970. Living Volutes. A monograph of the Recent Volutidae of the world. Delaware Museum of Natural History, Greenville. 375 p.